# Toxoplasmosis

## 1) THE DISEASE AND ITS EPIDEMIOLOGY

### A. Etiologic Agent

Toxoplasmosis is caused by *Toxoplasma gondii*, an intracellular protozoan parasite.

### B. Clinical Description

Most people who acquire toxoplasmosis will have no symptoms at all, but some will experience flu-like symptoms, swollen lymph glands, or muscle aches and pains that may last from a few days to several weeks. Symptoms may resemble mononucleosis, including fever, sore throat, and myalgia. However, in immunocompromised individuals, especially people with HIV/AIDS infection, toxoplasmosis may involve the brain (*e.g.*, encephalitis), less commonly the lungs, heart, eyes, or other organs, and may result in death. Infection during pregnancy (especially early in pregnancy) may result in congenital toxoplasmosis, and possibly death, for the fetus, and affected infants may demonstrate a variety of serious clinical problems at birth, including nervous system involvement, eye infection and other generalized disease. Toxoplasmosis may reactivate in individuals with past infection who become immunocompromised. Congenital infection may present years after birth with decreased vision due to eye involvement. Treatment is not routinely indicated in healthy, immunocompetent persons.

### C. Reservoirs

Cats (and members of the cat family) are the definitive hosts. They acquire the parasite from eating infected rodents or other meat. Other animals (notably rodents, sheep, goats, pigs, cows and birds) may be intermediate hosts and carry the infective cysts for a long period of time.

### D. Modes of Transmission

People become infected from accidentally eating oocysts (mature eggs) from dirt, sandboxes, or other places where cat feces may be found, or by eating undercooked meat from infected animals. Transplacental (congenital) transmission results from primary maternal infection during pregnancy. Outbreaks have been associated with unpasteurized milk or undercooked meat.

### E. Incubation Period

The incubation period is usually from 5 to 20 days when associated with cats; one outbreak from eating undercooked meat was associated with an incubation period of 10 to 23 days.

### F. Period of Communicability or Infectious Period

Except for *in utero* transmission, *T. gondii* is not transmitted directly from person-to-person. Oocysts shed by cats become infective from 1 to 5 days later and can remain infective in moist soil or water for over a year. Additionally, oocysts can remain infective in the meat of an infected animal until it is thoroughly cooked.

### G. Epidemiology

*T. gondii* is found throughout the world. Cats become infected when they eat infected rodents or are exposed to contaminated feces from other animals, and infection involves the gastrointestinal tract. Humans can become infected when they eat poorly cooked contaminated meat or accidentally eat the mature eggs found in contaminated soil or food. Infection in humans and mammals other than cats can involve any tissue. Most congenital cases occur as a result of primary infection during early pregnancy (often asymptomatic for the mother). Infection in humans is common.

# 2) REPORTING CRITERIA AND LABORATORY TESTING SERVICES

## A. What to Report to the Massachusetts Department of Public Health

**For congenital toxoplasmosis:**

- Report congenital toxoplasmosis suspected or diagnosed by a healthcare provider, or any laboratory results pertaining to toxoplasmosis in a fetus or newborn.

**For toxoplasmosis in an immunocompromised individual:**

- Report any confirmed cases of toxoplasmosis in immunocompromised individuals. For a case to be confirmed in this population, toxoplasma must be isolated from a clinical specimen or histologic evidence of tachyzoites (infective form of the disease) must be observed in a clinical specimen.

**For toxoplasmosis in others:**

- Report any confirmed cases of toxoplasmosis in immunocompetent individuals. For a case to be confirmed in this population, toxoplasma must be isolated from a clinical specimen, histologic evidence of tachyzoites (infective form of the disease) must be observed in a clinical specimen, or seroconversion or positive toxoplasma IgM antibody must be documented.

*Note:* See Section 3) C below for information on how to report a case.

## B. Laboratory Testing Services Available

The Massachusetts State Laboratory Institute (SLI) only provides serologic testing for babies as part of the newborn diagnostic work-up through the Newborn Screening Program. The SLI does not currently provide routine screening for other clinical samples.

# 3) DISEASE REPORTING AND CASE INVESTIGATION

## A. Purpose of Surveillance and Reporting

- To help identify the source of infection and prevent further perinatal transmission or transmission from other sources.
- To help identify and control outbreaks.

## B. Laboratory and Healthcare Provider Reporting Requirements

Refer to the lists of reportable diseases (at the end of this manual's Introduction) for information.

## C. Local Board of Health Reporting and Follow-up Responsibilities

1. **Reporting Requirements**

Massachusetts Department of Public Health (MDPH) regulations (*105 CMR 300.000*) stipulate that each local board of health (LBOH) must report the occurrence of any case of toxoplasmosis, as defined by the reporting criteria in Section 2) A above. Current requirements are that cases be reported to the MDPH Division of Epidemiology and Immunization, Surveillance Program using an official MDPH *Toxoplasmosis Case Report Form* (in Appendix A). Refer to the *Local Board of Health Reporting Timeline* (at the end of this manual's introductory section) for information on prioritization and timeliness requirements of reporting and case investigation.

2. **Case Investigation**

   a. It is the LBOH responsibility to complete a MDPH *Toxoplasmosis Case Report Form* (in Appendix A) by interviewing the case and others who may be able to provide pertinent information. Much of the

information required on the form can be obtained from the case's healthcare provider or the medical record.

b. Use the following guidelines to assist you in completing the form:
   1) Accurately record the demographic information, healthcare provider information, and whether hospitalized (including location and associated dates). If the case is a congenital case, record the information listed above for the *mother*.
   2) Complete the symptom history for the case (or mother for congenital cases). Include date of onset, type(s) and duration of symptoms, and treatment(s) received.
   3) Other medical questions about immune and/or pregnancy status may also be asked to further determine the source and/or risk of infection.
   4) Complete the "Laboratory Results" section.
   5) Exposure history of case (or mother, if congenital): Use the incubation period range for toxoplasmosis (5-20 days). Specifically, focus on the period beginning a minimum of 5 days prior to the case's onset date back to no more than 20 days before onset for the following exposures:
      a) Raw/undercooked meats: Determine the type(s) of meat and date(s) consumed by the case.
      b) Travel history: Determine the date(s) and geographic area(s) traveled to by the case.
      c) Soil/gardening: Determine the date(s) and geographic area(s) of exposures to soil/gardening.
      d) Cats: Determine if there is a history of exposure to cats, cat litter, cat feces, etc.
      e) Other animals/pets.
      f) Occupation (*e.g.*, farmer, pet store worker) or activities (hobbies like gardening or landscaping): Determine exposure risks through methods where contact with animals or contaminated soil occurs.
   6) If you have made several attempts to obtain case information, but have been unsuccessful (*e.g.*, the case or healthcare provider does not return your calls or respond to a letter, or the case refuses to divulge information or is too ill to be interviewed), please fill out the form with as much information as you have gathered. Please note on the form the reason why it could not be filled out completely.

c. After completing the form, attach lab report(s) and mail (in an envelope marked "Confidential") to the MDPH Division of Epidemiology and Immunization, Surveillance Program. The mailing address is:
   MDPH, Division of Epidemiology and Immunization
   Surveillance Program, Room 241
   305 South Street
   Jamaica Plain, MA 02130

d. Institution of disease control measures is an integral part of case investigation. It is the LBOH responsibility to understand, and, if necessary, institute the control guidelines listed below in Section 4), Controlling Further Spread.

## 4) CONTROLLING FURTHER SPREAD

### A. Isolation and Quarantine Requirements (*105 CMR 300.200*)

None.

### B. Protection of Contacts of a Case

In congenital cases, draw antibody titers in the mother; in acquired cases, antibody titers may be drawn on household contacts to determine a common exposure source.

### C. Managing Special Situations

**Reported Incidence Is Higher than Usual/Outbreak Suspected**

If you suspect an outbreak, investigate to determine the source of infection and mode of transmission. A common vehicle (such as contaminated food, soil or cat litter) should be sought and applicable preventive or control measures should be instituted. Consult with the epidemiologist on-call at the Division of Epidemiology and Immunization at (617) 983-6800 or (888) 658-2850. The Division can help determine a course of action to prevent further cases and can perform surveillance for cases that may cross several town lines and therefore be difficult to identify at a local level.

*Note:* Refer to the MDPH's *Foodborne Illness Investigation and Control Reference Manual* for comprehensive information on investigating foodborne illness complaints and outbreaks. (Copies of this manual were distributed to local boards of health in 1997–98. It can also be located on the MDPH website in PDF format at <http://www.magnet.state.ma.us/dph/fpp/refman.htm>.)

### D. Preventive Measures

To prevent future exposures, recommend the following.

**Pregnant women should:**

- Always thoroughly cook meats before eating. Freezing reduces the infectivity level but does not eliminate it.
- Do not clean cat litter boxes or pans.
- Always wear gloves during gardening or other contact with soil, wash hands immediately after contact, and always wash hands thoroughly before eating.

**All others should:**

- Feed cats dry or canned food, and prevent them from hunting.
- Clean up cat litter boxes or cat feces daily. Handle and dispose of cat feces carefully.
- Always wash hands before eating, and after handling cat or other animal feces, handling uncooked meat, or touching soil that might have cat feces in it.
- Cover children's sandboxes/sand piles to keep animals from defecating in play areas.
- Consider being tested for *Toxoplasma* if planning pregnancy (pre-existing infection in mothers is rarely, if ever, associated with congenital toxoplasmosis).

## ADDITIONAL INFORMATION

There is no formal Centers for Disease Control and Prevention (CDC) surveillance case definition for toxoplasmosis. (CDC case definitions are used by the state health department and CDC to maintain uniform standards for national reporting.) Always refer to Section 2) A for the criteria in reporting a case to the MDPH.

## REFERENCES

American Academy of Pediatrics. *1997 Red Book: Report of the Committee on Infectious Diseases, 24th Edition*. Illinois, American Academy of Pediatrics, 1997.

CDC Website. Toxoplasmosis Fact Sheet. Available at <http://www.cdc.gov/ncidod/dpd/parasites/toxoplasmosis/factsht_toxoplasmosis.htm>. Updated August 15, 1999.

Chin, J., ed. *Control of Communicable Diseases Manual, 17th Edition*. Washington, DC, American Public Health Association, 2000.

MDPH. *Regulation 105 CMR 300.000: Reportable Diseases and Isolation and Quarantine Requirements*. MDPH, Promulgated November 1998, (Printed July 1999).